Dubakella Plantations Insect and Disease Project

Background

The Agriculture Act of 2014 (i.e. 2014 Farm Bill) Section 8204 amended the Healthy Forest Restoration Act of 2003 by adding two sections to Title IV to address qualifying insect and disease infestations on National Forest System lands: section 602 (Designation of Treatment Areas) and section 603 (Administrative Review).

Per Section 602, an area may be designated as part of an insect and disease treatment program if it meets at least one of three criteria related to forest health decline, tree mortality, or hazardous trees. On May 14, 2015, Chief Tidwell determined the Dubakella watershed meets one or more of the criteria and designated the watershed as a landscape scale insect and disease area.

Section 603 established a categorical exclusion (CE) for qualifying insect and disease projects in designated areas. An insect and disease project that may be categorically excluded under this authority is a project that is designed to reduce the risk or extent of, or increase the resilience to, insect or disease infestation in the areas (HFRA, Sections 602(d) and 603(a)).

To use the Farm Bill Categorical Exclusion (CE), a project must meet the following requirements:

- The project is in an area designated in accordance with section 602(b) and (c) of the Healthy Forest Restoration Act.
- The project is limited to areas in the Wildland Urban Interface (WUI) or, if outside the WUI, must be in Condition Classes 2 or 3 Fire Regime Groups I, II, or III.
- The project is not located: in congressionally designated Wilderness and Wilderness Study Areas; in areas where the removal of vegetation is restricted or prohibited by act of Congress or by Presidential proclamation; or in areas where the activities described above would be inconsistent with the applicable Land and Resource Management Plan.
- The project's number of acres treated may not exceed 3,000 acres.
- The project does not include the establishment of permanent roads. Necessary maintenance and repairs on existing permanent roads is permissible.
- Temporary roads constructed will be decommissioned no later than three years after the date the project is completed.
- Public notice and scoping will be conducted.
- The best available scientific information is considered to maintain or restore ecological integrity, including maintaining or restoring the structure, function, composition and connectivity.
- The project maximizes the retention of old growth and large trees, as appropriate for the forest type, to the extent that the trees promote stands that are resilient to insect and disease.
- The project is developed and implemented through a collaborative process.

Planning Area Location and Characterization

The planning area is the Dubakella subwatershed which surrounds the community of Wildwood, California; in all or portions of: T28N R11W Sections 1-4, 10, &11; T 29N R12W Sections 13 & 14; T30N R11W Sections 1, 2, 11-14, 23-26, 35, & 36; T29N R11W Sections 1-3, 7-12, 13-24, 26-29, & 32-35; T29N R10W Sections 4-8, 17, & 18; and T30N R10W Sections 6, 7, 18-21, & 28-33, Mount Diablo Meridian. The planning area topography varies from flat to gently sloping in and around the Wildwood area and mountainous in the rest of the watershed. Elevations range from 2,720 to 5,680 feet in elevation. Please see the attached map.

Hayfork Creek bisects the planning area and drains a basin of roughly 248,000 acres and is the largest tributary of the South Fork of the Trinity River, which flows into the main Trinity River and then to the Klamath River before reaching the Pacific Ocean. The 105,766 acre Upper Hayfork Creek Watershed

includes the Dubakella subwatershed (32,508 acres) which encompasses the headwaters of Hayfork Creek downstream to its confluence with East Fork Hayfork Creek. Five other subwatersheds comprise the remaining portion of the Upper Hayfork Creek Watershed. See Figure 1.

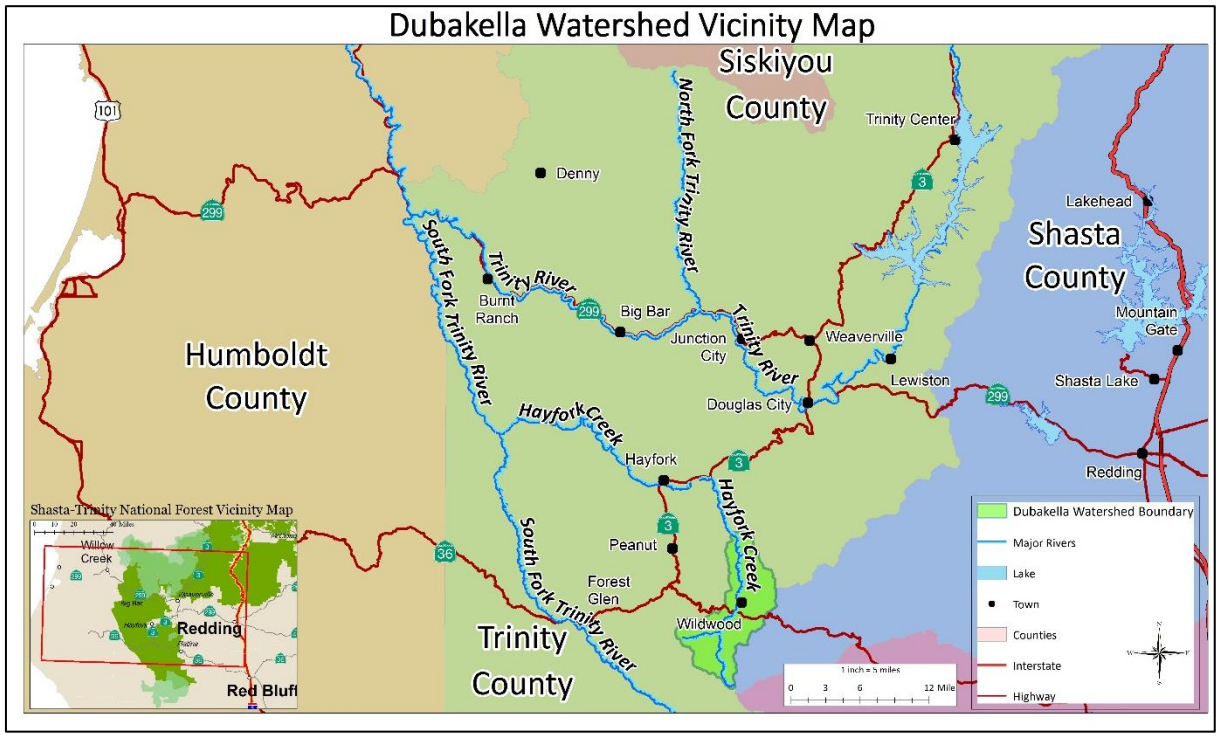

Figure 1. Dubakella Watershed Vicinity Map

Precipitation varies from 40 inches per year in the lower elevations to as much as 70 inches per year along the ridgelines between Dubakella and Red Mountain, with a distinct wet period from November through April and a dry period from May through October. Channel forming flows are usually associated with winter Pacific storms after an early period of subsurface recharge. Rain-on-snow events may occur.

Native Americans occupied the Hayfork Creek drainage for thousands of years, and dozens of prehistoric archeological sites preserve a record of their activities. Many of the nor-el-muk (Hayfork Wintu) still live in the area and have an active interest in the Hayfork drainage.

Anglo-American settlement of Hayfork Valley began in 1852 and it soon became known as the "granary of the county." Much of the area was public domain and was heavily grazed, predominantly by cattle and horses. The mid-1850s saw the beginning of placer mining on several tributaries of the upper Hayfork drainage including the Wildwood area. Placer mining was later followed by dragline mining and hardrock mining. The lumber industry developed concurrently with the local need for wood products in ranching and mining operations, and became economically important in national markets after World War II. The 1905 formation of the Trinity Forest Reserves (later the Trinity National Forest) led to changes in forest management practices, particularly in grazing and fire suppression.

Fire is a significant disturbance factor within the planning area. Prior to the initiation of organized fire suppression in the early 1900's, the area was characterized by fires of a short return interval. These fires typically were low intensity, surface fires at intervals of 5 to 30 years. Vegetation types in this fire regime were dominated by fire adapted, fire resistant species. The exclusion of fire, along with other human caused disturbances, has initiated a transition to a fire regime characterized by more frequent, high intensity fire events and vegetation changes such as greater abundance of white fir. This shift in fire regime has resulted in a transition of fuel composition. Fuels have changed from primarily surface fuels at a low level of loading to moderate or high levels of surface loading, with a vertical fuel ladder connecting

the surface fuels to the crowns of the dominant conifers. Parts of the watershed dominated by ultramafic soils do not show this fuel loading, or show it to a lesser degree.

The most notable fire feature in the planning area is the Jones burn, which occurred in 1959. The Jones Burn created a 5000 acre feature in the planning area and resulted in the establishment of many plantations.

Areas of natural stands adjacent to the plantations that have not been treated before are in Condition Class 3, natural stands that have received treatment are currently a mix of Condition Class 2 and 3, with Condition Class 2 being found in areas where treatments are still effective.

Infrastructure in the planning area consists of roughly 250 miles of roads ranging from state highway to rudimentary jeep roads and 8 miles of trails largely associated with the Chanchellula Wilderness just outside the project area to the northeast. The town of Wildwood lies in the center of the Dubakella subwatershed and was a logging industry supported town prior to the mill closing in the late 1970's. Early settlement developed water diversions for domestic and agriculture which still exists today.

Forest Plan Land Allocations and Management Area

The project is guided by management direction in the Shasta-Trinity National Forests Land and Resource Management Plan (Forest Plan) (USDA-FS, 1995), which incorporated the Northwest Forest Plan (USDA-FS, USDI-BLM, 1994), as amended. The Forest Plan provides four levels of direction: (1) general Forest-wide management direction; (2) Direction based on land allocations from the Northwest Forest Plan; (3) direction specific to each management prescription (or type of land allocation); and (4) specific (or supplemental) direction for each management area within the Forests. Forest-wide standards and guidelines can be found at Forest Plan pages 4-11 through 4-30. Management prescriptions can be found on pages 4-33 to 4-71 and Management Area direction on pages 4-72 through 4-171.

The direction from the Forest Plan for the Dubakella watershed emphasizes wildlife habitat management and sustained commercial timber production. Late-successional stage dependent species habitat management is the emphasis for Late-Successional Reserve areas (Forest Plan Rx VII - Late-Successional Reserves). The areas outside of Late-Successional Reserves are within the Hayfork Adaptive Management Area (AMA) where both early to mid-seral stage dependent species (Rx VI - Wildlife Habitat Management) and timber production (Rx VIII - Commercial Wood Products Emphasis) are emphasized. Management actions within the AMA are supposed to encourage the development, testing, and application of forest management practices which provide for a broad range of forest values, including commercial timber production, and provision of late-successional and high quality riparian habitat.

The Chanchellula Wilderness extends into the northeastern part of the Dubakella watershed, this area falls into the wilderness management prescription (Rx X - Wilderness) under the Forest Plan. No treatments are proposed or will occur in the wilderness but it is mentioned as it lies within the Dubakella watershed that is designated for this CE category described in the Background section on page 1.

Table 1. Forest Plan Land Allocations for Dubakella Watershed.

Designation	Prescription	Acres	Riparian Reserve Acres
LSR		11823.8	156.9
AMA		17357.6	316.8
	• Roaded Recreation	204.5	0
	• Wildlife Habitat	4765.5	44.8
	• Commercial Wood Products	12387.7	272.0
Private Ownership		2727.4	0.1
Wilderness		599.8	1.5
Watershed Acreage		**32508.7**	

Refer to Chapter 4 in the Forest Plan for more specific management direction.

Riparian Reserves are managed to meet the 9 Aquatic Conservation Strategy objectives.

The project is located within the boundaries analyzed in the Upper Hayfork Creek Watershed Analysis (1998).

Wildland Urban Interface (WUI) as defined in the Forest's Fire Reference System (USDA-PS, 2015) encompasses approximately 17,820 acres of the planning area (see Figure 2) with 1,200 of those acres being within plantations considered for analysis. The policy of providing for firefighter and public safety is implicit in considering all fire and fuels desired conditions, regardless of land allocation and management direction (USDA-PS, 2015).The defense zone of WUIs is up to 0.25 miles from structures and major routes that provide for ingress/egress (such as the Wild-Mad Road/FS 30 road).

Project Area

The project area includes plantations proposed for treatment that originated between 1957 and 1993 and range in size from 1 to 61 acres, totaling approximately 2,950 acres of plantations. It is anticipated the proposed acreage will be reduced by other resource limitations (i.e. archaeology sites, sensitive botanical species, inaccessibility, etc.). Once the other limitations are included, natural stands adjacent to plantations and roads may be considered for prescribed burning in order to increase the resilience to insect or disease infestation. The prescribed burning will extend through natural stands to existing roads up to the 3,000 acre treatment limit described in the 2014 Farm Bill.

Purpose

The overall purpose for this project is to develop and maintain vigorous and healthy forest stands within existing plantations to increase the resilience to insect or disease infestation and other natural disturbances. Forest health issues stem from stands being overly dense. Forest stands are considered overly dense when density of trees growing on an acre results in increased mortality due to competition, lack of water and resources for all trees, and decreased ability of trees to survive droughts, insects, and disease. Plantations throughout the project area are overly dense (100-1,200 or more trees per acre) and contain high levels of surface and ladder fuels.

The plantations within the Dubakella watershed are experiencing mortality from insects and disease due to overstocking. In many areas, the adjacent natural stands are also experiencing areas of mortality from insects and disease as demonstrated in the Insect and Disease Risk Map Viewer[1].

Snapshots of the 2013-2017 National Insect and Disease Risk Map Viewer for the project vicinity are shown in Figures 2a thru 2g on the following page. The first two figures are for background reference,

[1] The National Insect and Disease Risk Map Viewer is a publicly available website from the Forest Health Protection department within the State and Private Forestry Deputy Area of the U.S. Department of Agriculture (USDA) Forest Service. The National Insect and Disease assessment is defined as: a nationwide strategic assessment and database of the potential hazard for tree mortality due to major forest insects and diseases. The 2013-2017 National Insect and Disease Risk Map Viewer is available here: https://foresthealth.fs.usda.gov/nidrm/. Snapshots included in this document were taken January 11, 2018.

with Figure 2a simply showing the watershed boundary. Figure 2b shows the overstocking that is present within the watershed, note the northern half is in the >140 BA category. Figure 2c illustrates the composite basal areal loss that is occurring within the watershed due to all the survey insect and disease issues, note that the overstocked areas from Figure 2b are the areas demonstrating the most issues. Western pine beetle effects are shown in Figure 2d; much of the project area falls within the area of 16 % or greater percent host basal area loss from bark beetles. Douglas-fir is being impacted by fir engravers as well as Heterobasidion root disease as seen in Figures 2e and 2f. Where the fir engravers are causing damage, the damage is extensive causing at least 16% or greater and in many cases greater than 30% BA loss projected.

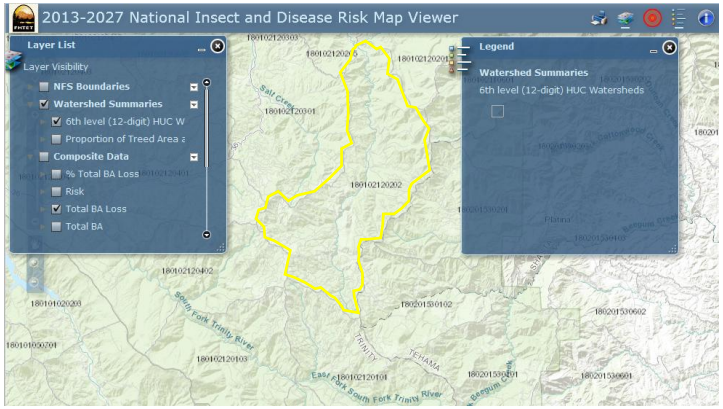

Figure 2a. Dubakella Watershed-For Viewing Reference of next 5 figures

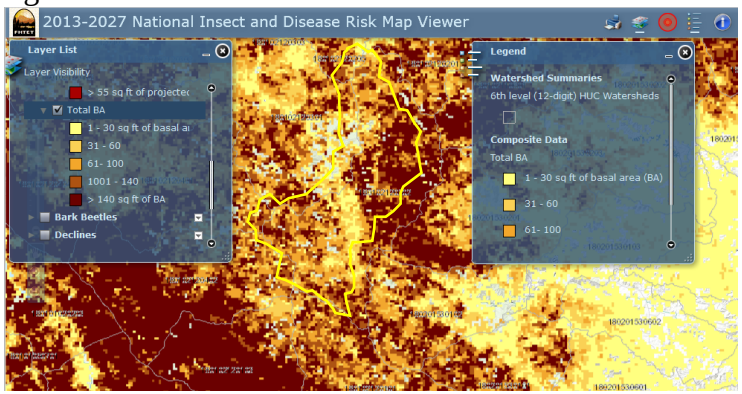

Figure 2b. Composite Total BA-Illustrates overstocking

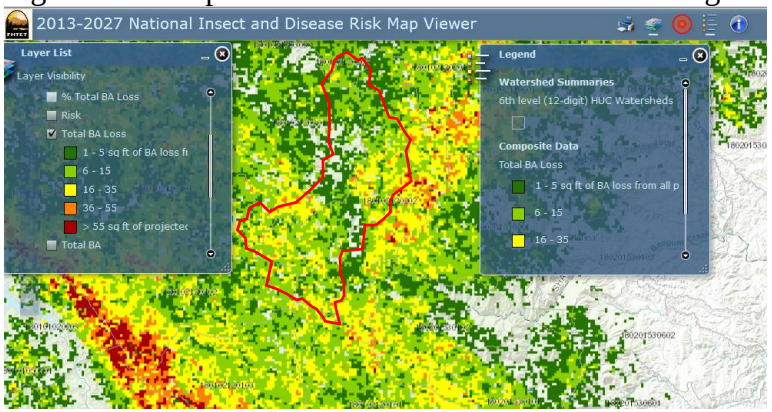

Figure 2c. Composite Total BA Loss

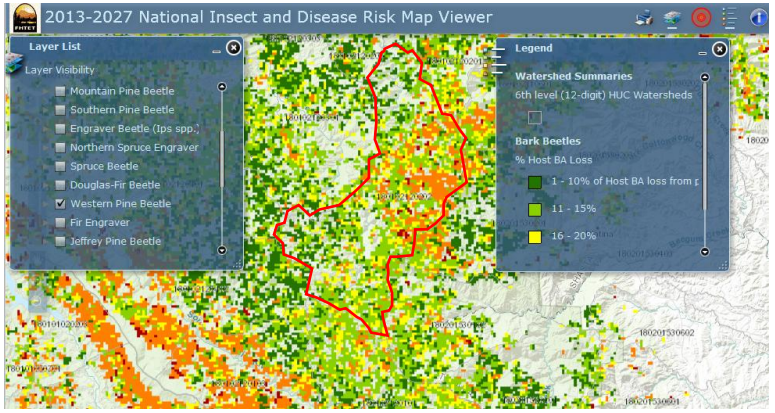

Figure 2d. Western Pine Beetle % Host BA Loss

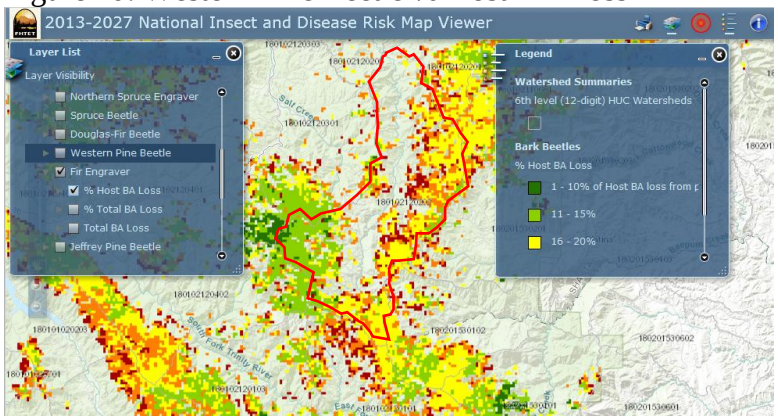

Figure 2e. Fir Engraver-% Host BA Loss

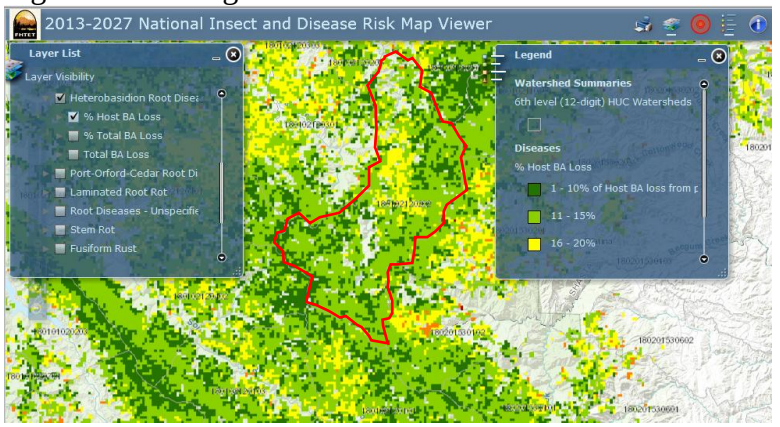

Figure 2f. Heterobasidion Host % BA Loss

Based on stand exams, most plantations proposed for treatment are overly dense and experiencing varying levels of insect and disease issues. Much of the project area falls within the area of 16 % or greater percent host basal area loss from bark beetles. Douglas-fir is being impacted by fir engravers as well as Heterobasidion root disease. Where the fir engravers are causing damage, the damage is extensive causing at least 16% or greater and in many cases greater than 30% BA loss projected. Additionally, the stands are overall of low species and age class diversity, though some ingrowth of other tree species exists. Stand data collected from roughly half of the plantations within the watershed collected during the summers of 2016 and 2017 is summarized in Table 2 below.

Table 2. Trees per acre (TPA) within Dubakella watershed plantations.

	Conifer TPA	Hardwood TPA	Total TPA
Average	396	107	503
Max	1183	633	1264
Min	33	0	100

With such high numbers of trees per acre, diameters and heights are smaller than would be experienced if the stands weren't so dense. Stands are were regenerated using mainly ponderosa pine (Pinus ponderosa), with some areas having Douglas-fir (Pseudotsuga menziesii) planted as well. White fir (Abies concolor) saplings are appearing in the understory. The target stocking levels for ponderosa pine plantations varies depending on site quality, elevation, and hardwood and shade intolerant cohabitants, but is typically closer to 100 trees per acre. Mixed conifer species stands usually function at a higher stocking level than pine plantations, closer to 150 trees per acre.

Pockets of ponderosa pine mortality are appearing as a result of the overstocking that is present. Pockets range in size from 3-10 trees each (40 in some cases) in less than 1 acres patches and are caused by western pine beetle (Dendroctonus brevicomis), **Error! Reference source not found.** illustrates some of the tree die off that is occurring.

Figure 2. Example of young ponderosa pine killed by western pine beetle on edge of the Jones Burn Rehab 3 plantation.

Forest Health Protection Recommendations

The area is at risk of continued western pine beetle-caused mortality in ponderosa pine due primarily to overstocking. As with most bark beetles, the most economical and efficient means of management is to maintain trees and stands in a healthy condition. Stocking reduction and creation of diverse stand conditions reduce overall susceptibility to western pine beetle. The reduction to 100 trees per acre will provide greater stand resilience to western pine beetle attack in these plantations. Clean-up and removal of the large diameter broken tops and stems in the areas affected by storm damage is advised to reduce the risk of Ips causing mortality and further topkill in the residual trees in the storm damaged plantations. (Snyder, 2018). Broken tops and topkill that is occurring within the plantations is depicted in Figure 3 below.

Figure 3. Top breakage in overly dense ponderosa and Jeffery pine plantations resulting in western pine beetle attacks to both affected and non-affected ponderosa pine.